



## Horizontal and Vertical Asymptotes

$$f(x) = \frac{(2x + 8)(x - 2)}{(x - 4)(x - 3)}$$

$$(x - 4)(x - 3) \neq 0$$

$$(x - 4) \neq 0 \quad (x - 3) \neq 0$$

$$x \neq 4 \quad x \neq 3$$

$$f(x) = \frac{\sqrt{x + 4}}{(x + 4)(x - 5)}$$

$$(x + 4)(x - 5) \neq 0$$

$$(x + 4) \neq 0 \quad (x - 5) \neq 0$$

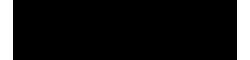


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[scaa@csueastbay.edu](mailto:scaa@csueastbay.edu)

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## Horizontal and Vertical Asymptotes

$$2(x^2 - 7x + 12) = 2x^2 + 4x - 16$$

$$2x^2 - 14x + 24 = 2x^2 + 4x - 16$$

$$-14x + 24 = 4x - 16$$

$$-18x = -40$$

$$40 = 18x$$

$$0 = \sqrt{x + 4}$$

$$0^2 = (\sqrt{x + 4})^2$$

$$0 = x + 4$$

$$x = -4$$

$$x \neq -4$$

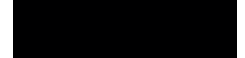


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[scaa@csueastbay.edu](mailto:scaa@csueastbay.edu)

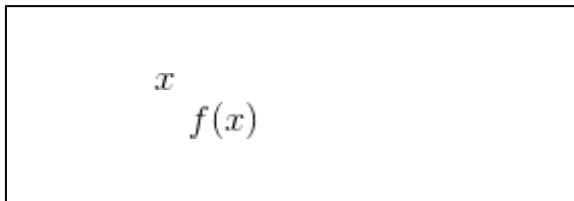
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# Horizontal and Vertical Asymptotes

$$\frac{(2(2.9) + 8)((2.9) - 2)}{2.9 - 2}$$

$$\Rightarrow \lim_{x \rightarrow 3^-} f(x) = +\infty$$



$$\lim_{x \rightarrow -4^+} \frac{\sqrt{x+4}}{(x+4)(x-5)}$$

$$= \frac{\sqrt{-4^+ + 4}}{(-4^+ + 4)(-4^+ - 5)}$$

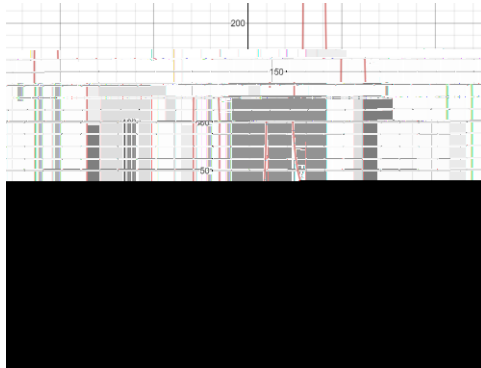
$$= \frac{\sqrt{(-3.9) + 4}}{(-3.9 + 4)(-3.9 - 5)}$$

$$= \frac{(+)}{(+)(-)} = \frac{(+)}{(-)} = (-)$$

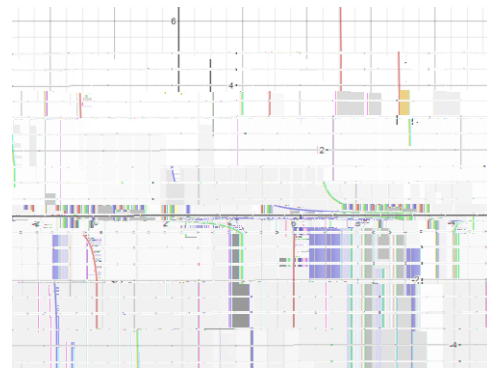
$$\Rightarrow \lim_{x \rightarrow -4^+} f(x) = -\infty$$

Graphing

Example A



Example B



*Stewart James, Algebra and Trigonometry, 4th Ed.*



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[scaa@csueastbay.edu](mailto:scaa@csueastbay.edu)

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